Development of Athletic Training Learning Over Time Instruments

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SINCE the phrase "Learning Over Time" (LOT) was first introduced, it has caused considerable confusion among the faculty of Athletic Training Education Programs (ATEPs).[1] This confusion extends beyond the definition of the concept, because the documentation of LOT presents a difficult challenge.

Feinman-Nesmer[2] addressed LOT in the context of professional teacher preparation, integration, and professional development. She presented the concept as an integration of knowledge into professional practice, but she did not discuss documentation of LOT. Letus, Moessner, and Dooley[3] discussed LOT in the context of using portfolios to document learning that cannot be documented through traditional grades and exams. They felt that it is important for a student to reflect upon his or her education over time to assimilate and apply what has been learned. Konin, Amato, and Brader [5] addressed LOT as an extension of a previously proposed concept of mastery over time.[6] They presented the LOT concept as a sequential and progressive process of knowledge acquisition that extends from classroom instruction to clinical practice. They advocated the use of multiple sources of information to document LOT.

Key Points

- A set of instruments for documenting LOT has been developed.
- Programs can adapt these instruments to their specific needs.

We have developed instruments that can be used to document LOT as a student progresses through an ATEP. The intent was to develop instruments that would be applicable to almost any injury or illness. The instruments are designed to document integration of knowledge and skills from several different content areas, synthesis of information, and critical thinking that is associated with injury or illness assessment and development of a treatment plan. In a previous report,[4] we presented a case study that utilized these instruments for documentation of LOT. This report presents the results of a reliability study for our LOT instruments.

Instrument Validity

Three instruments were developed to measure and document LOT (Figure 1). Face validity was established by three athletic training educators who had 30 years of combined teaching experience and terminal degrees in higher education/pedagogy.[4] The instruments were developed for three content area courses (Care and Prevention of Injuries, Injury/Illness Evaluation, and Therapeutic Modalities). The most common components of each content area were identified. The components chosen for the Care and Prevention instrument were (a) assessment, (b) immediate care options, (c) return to play considerations, (d) demonstration of the immediate care intervention, and (e) demonstration of the return-to-play intervention.

Injury Assessment

Name _____ Date _____

Body Part being evaluated _____

Definitions:

Skill – ability to perform the component with expertise, judgment, and knowledge

Efficiency – ability to perform the component with a minimum of effort or waste

Scores:

1 – not proficient, needs work

3 – proficient, adequate

5 – very proficient, excellent

(write-in 2 or 4 when needed)

History

Skill			Efficiency		
1	3	5	1	3	5

Comments:

Observation/Inspection

Skill			Efficiency		
1	3	5	1	3	5

Comments:

Palpation

Skill			Efficiency		
1	3	5	1	3	5

Comments:

Functional Tests

Skill			Efficiency		
1	3	5	1	3	5

Comments:

Overall comments/suggestions:

_____

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Special/Ligamentous Tests

Skill			Efficiency		
1	3	5	1	3	5

Comments:

Neurovascular

Skill			Efficiency		
1	3	5	1	3	5

Comments:

Assessment – Reports Their Findings to the Athlete

Skill			Efficiency		
1	3	5	1	3	5

Comments

_____

Student signature

(continued)

Figure 1 **Content area instruments.**

Preventative Injury Care

Name _____ Date _____

Immediate intervention utilized _____

Return-to-play intervention utilized _____

Definitions:

Skill – ability to perform the component with expertise, judgment, and knowledge

Efficiency – ability to perform the component with a minimum of effort or waste

Scores:

1 – not proficient, needs work

3 – proficient, adequate

5 – very proficient, excellent

(write-in 2 or 4 if needed)

Assessment of Problem/Situation

Skill			Efficiency		
1	3	5	1	3	5

Comments:

Decides Upon and Discusses an Immediate Intervention

Skill			Efficiency		
1	3	5	1	3	5

Comments:

Decides Upon and Discusses a Return-to-Play Intervention

Skill			Efficiency		
1	3	5	1	3	5

Comments:

Demonstrate Immediate Intervention

Skill			Efficiency		
1	3	5	1	3	5

Comments:

Demonstrate Return-to-Play Intervention

Skill			Efficiency		
1	3	5	1	3	5

Comments:

Overall comments/suggestions:

_____ _____

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Figure 1 *(continued)*

Therapeutic Modalities

Name _____ Date _____

Modality being utilized _____

Definitions:

Skill – ability to perform the component with expertise, judgment, and knowledge

Efficiency – ability to perform the component with a minimum of effort or waste

Scores:

1 – not proficient, needs work

3 – proficient, adequate

5 – very proficient, excellent

(write-in 2 or 4 if needed)

Discusses Indications/Contraindications

Skill			Efficiency		
1	3	5	1	3	5

Comments:

Equipment

Skill			Efficiency		
1	3	5	1	3	5

Comments:

Preparation and Treatment

Skill			Efficiency		
1	3	5	1	3	5

Comments:

Ending Treatment

Skill			Efficiency		
1	3	5	1	3	5

Comments:

Overall comments/suggestions:

_____ _____

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Figure 1 ***(continued)***

The components chosen for the Injury Assessment instrument were (a) acquisition of history, (b) observation/inspection for signs of trauma, (c) palpation for areas of tenderness, (d) range of motion assessments, (e) performance of special tests, (f) performance of a neurovascular assessment, and (g) development of a conclusion. The components chosen for the Therapeutic Modalities instrument were (a) discussion of indications/contraindications, (b) set-up of the equipment, (c) demonstration of treatment administration, and (d) termination of treatment.

Reliability Assessment

Subjects were recruited from the undergraduate Athletic Training program of a large Division I university. Informed consent was obtained from each subject before data collection proceeded. Ten students from the senior class (5 females and 5 males, 21 to 24 years of age) were used as subjects.

To establish the reliability of each instrument, athletic training students were individually presented with a simulated patient who exhibited a predetermined injury. The simulated patient exhibited one of three common lower extremity injuries (inversion ankle sprain, Achilles tendonitis, or a Jones fracture). The students were required to assess the injury, discuss and apply preventative care techniques, and discuss and apply therapeutic modalities. Two athletic training educators, who had 15 years of combined teaching experience, observed and independently rated each component of the three content areas for both skill and efficiency: 1 = not proficient/needs work; 3 = proficient/adequate; and 5 = very proficient/excellent. Both evaluators had previous experience with the three instruments. Skill was defined as the ability to perform the component with expertise, judgment, and knowledge. Efficiency was defined as the ability to perform the component with minimal waste of effort or resources.

The Pearson correlation coefficient was calculated to represent agreement between the two evaluators. Skill and efficiency means and standard deviations were calculated for each of the three separate instruments and for the three instruments collectively. SPSS 16.0 and Microsoft Excel were used to perform all calculations, which are presented in Table 1. Correlation coefficients between .30 and .60 were found for two-thirds (21 of 32) of the skill and efficiency ratings.

Table 1. Correlation Results for Each Task, Mean (SD) Correlation Results for each Content Area, and Mean (SD) Correlation Results for Skill and Efficiency

Content Area General Task	Component	Correlation
Injury Assessment		
History	Skill	.583
	Efficiency	.574
Observation/Inspection	Skill	.661**
	Efficiency	.752**
Palpation	Skill	.055
	Efficiency	.491
Functional tests	Skill	.744**
	Efficiency	.604
Special tests	Skill	–.122
	Efficiency	.722**
Neurovascular	Skill	.638**
	Efficiency	.791*
Assessment/Diagnosis	Skill	.090
	Efficiency	.238
Mean (SD) for Injury Assessment	Skill	.378 (.35)
Mean (SD) for Injury Assessment	Efficiency	.596 (.32)

Content Area		
General Task	**Component**	**Correlation**
Preventative Injury Care		
Assessment of injury	Skill	.323
	Efficiency	.352
Discuss immediate care	Skill	.087
	Efficiency	.073
Discuss return to play	Skill	.325
	Efficiency	.164
Demonstrate immediate care	Skill	.698**
	Efficiency	.802**
Demonstrate return to play	Skill	.549
	Efficiency	.729**
Mean (SD) for Preventative Injury Care	Skill	.396 (.23)
Mean (SD) for Preventative Injury Care	Efficiency	.424 (.32)
Therapeutic Modalities		
Discuss indications	Skill	.238
	Efficiency	.577
Equipment set-up	Skill	.479
	Efficiency	.659**
Preparation and Treatment	Skill	.104
	Efficiency	0.0
End treatment	Skill	.687**
	Efficiency	.739**
Mean (SD) for Therapeutic Modalities	Skill	.377 (.25)
Mean (SD) for Therapeutic Modalities	Efficiency	.493 (.33)
	Mean (SD) for Skill	.383 (.28)
	Mean (SD) for Efficiency	.517 (.26)

Abbreviation: (SD) Standard Deviation

* $p < .001$

** $p < .05$

Discussion

We interpret our results to suggest that the LOT instruments have an acceptable level of reliability for ratings of both skill and efficiency in each content area. The Care and Prevention instrument demonstrated the highest correlation values, which may have been due to our curriculum sequence. The .09 correlation for the skill component of the assessment/diagnosis task of the Injury Assessment instrument is troubling. If the evaluators cannot agree that a student is properly applying skills to establish a correct assessment/diagnosis, the student may not be receiving constructive feedback during the process of learning the skill. Letus,

Moessner, and Dooley[3] discussed the LOT concept in the context of using portfolios to document learning that cannot be documented through grades and exams. The authors described how portfolios allow students to reflect upon educational experiences over time and to determine what the learning process means to them personally and professionally. A qualitative approach to LOT is important to consider. Our LOT evaluation plan includes self-reflection by the student following skill demonstration.

Kell and van Deursen[7] discussed the LOT concept in the context of learning preferences and self-directed learning of adult students. Clinical practice requires the use of problem-solving skills and critical thinking, which are central to the application of the LOT concept to athletic training education.

Further assessment of the psychometric properties of the instruments should utilize a much larger sample of students who have attained differing levels of clinical skill. Development of a scoring rubric that clearly defines the meaning of each level of the 5-point scale may enhance the reliability of the instruments.

Summary

Our approach to documentation of LOT could be used to assess almost any psychomotor skill. Every athletic training educator should promote the development of problem solving and critical thinking skills, which are not acquired quickly. Documentation of LOT is important to ensure that each student acquires the necessary knowledge and skills during progression through an ATEP to ultimately become a clinician who provides high-quality patient care.

References

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